Run11 Status, Plans, and Goals

STOCHASTIC COOLING

BROOKHAVEN NATIONAL LABORATORY

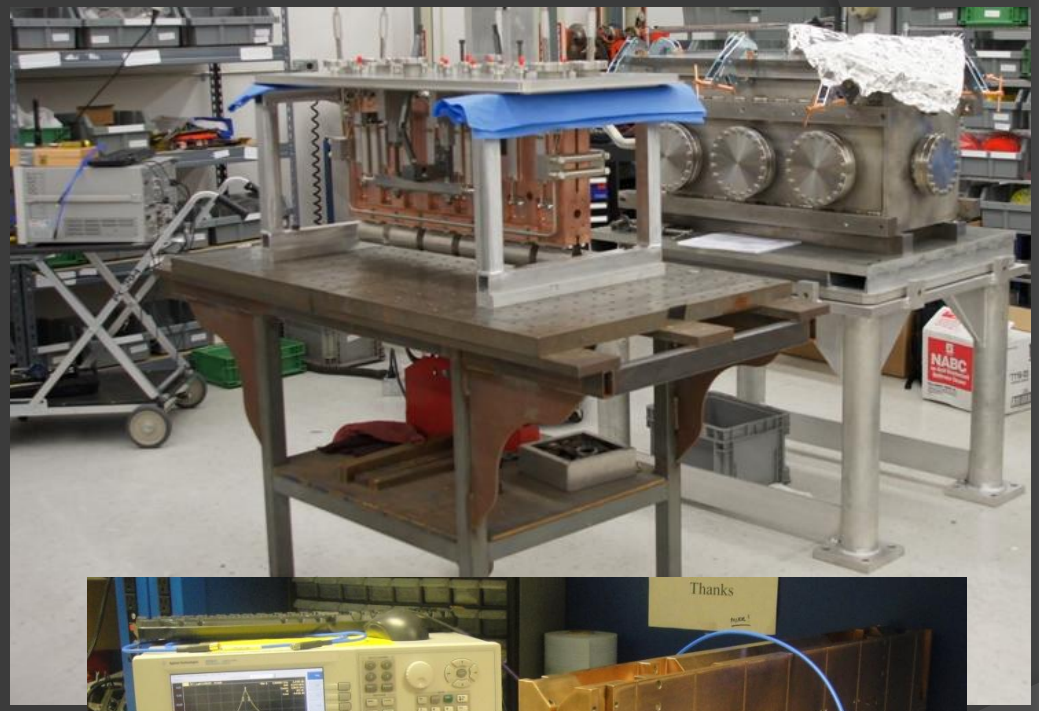
APEX Workshop
October 19, 2010

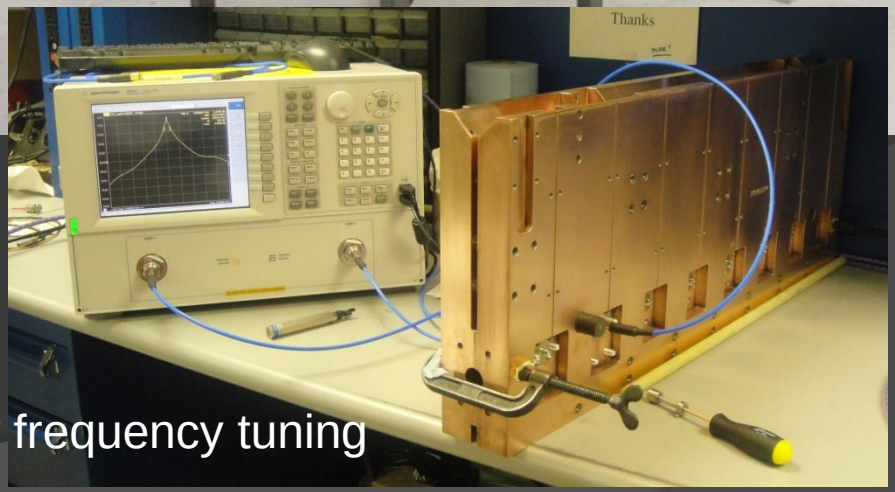
Installation Status

- Replacement blue vertical kickers will be installed in sector 12
- New blue horizontal pickup will be installed in sector 3
- Blue vertical pickup will be refurbished in sector 3
- Yellow longitudinal kicker is installed in sector 11
- Horizontal kickers and yellow horizontal pickup will not be installed this year
- Various low-level RF components, power supplies, RF power amplifiers, cavity temperature controllers, etc. need to be installed

Blue Vertical Kicker

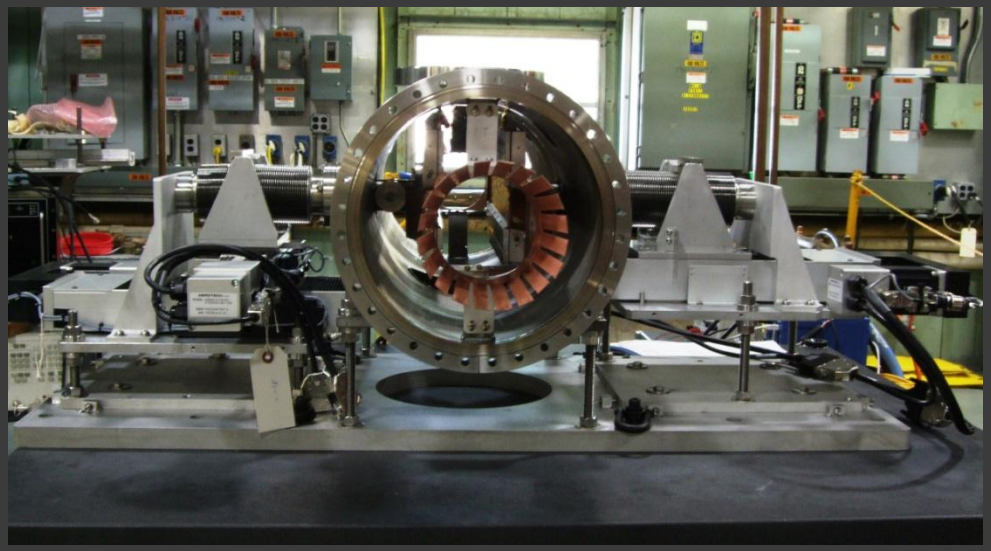
- The blue vertical kickers are being replaced to fix vacuum leaks and to change the cavity frequencies
- One of the two tanks was delivered from Incodema last week
- The second tank will be assembled and delivered late this week
- The tanks need baking, vacuum testing, welding of the top plate, and final installation

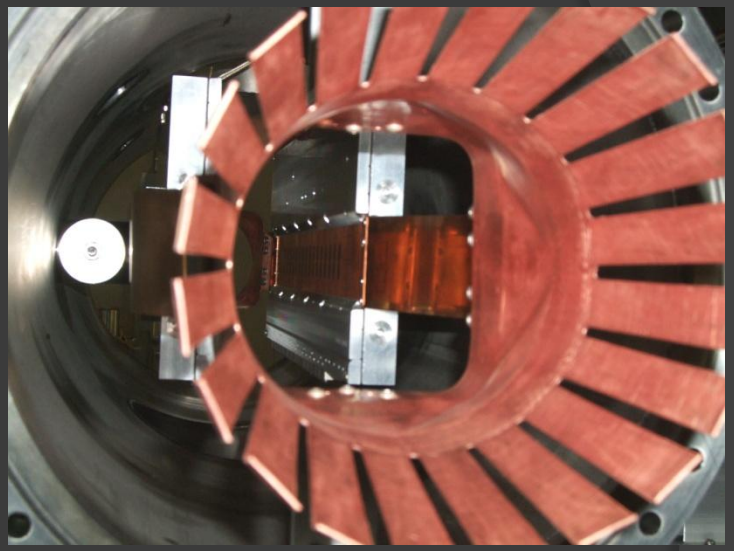




Cavity frequency tuning

Blue Horizontal Pickup





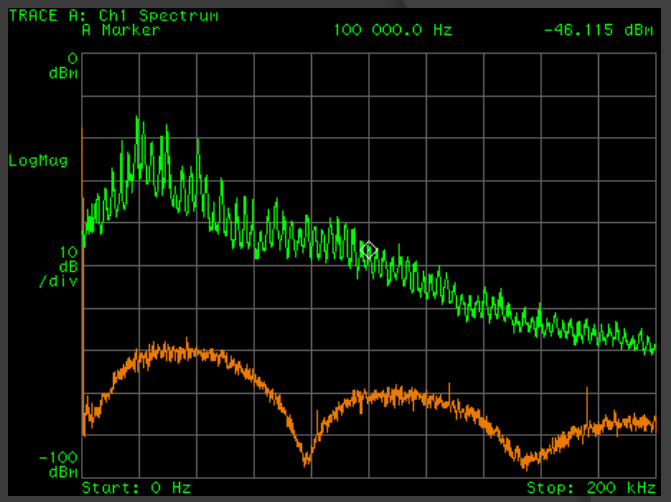
- The pickup is being built in-house
- Many issues have been resolved already
- The end flanges are currently being reworked
- We expect it will be ready to be installed before the run for testing of the new design

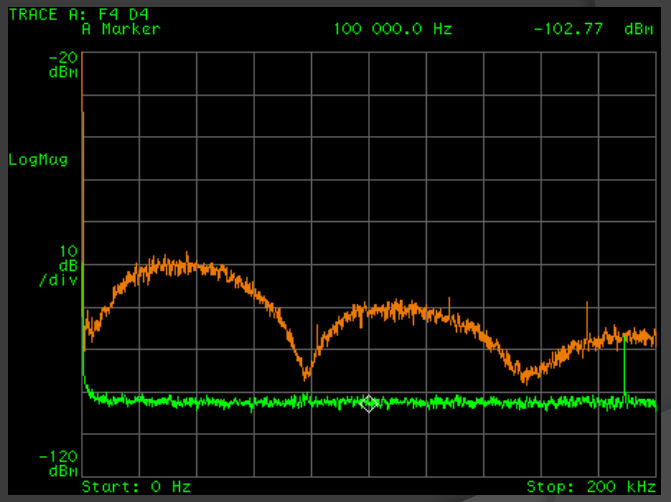
Plans for improvements

- Pilot tone correction for longitudinal microwave links is being enhanced
- New RF components at vertical pickups should help with common mode rejection
- Started testing of longitudinal pickups at Accelerator Test Facility
- Initial results of these tests, along with experience from Run10, have led to an idea for a new longitudinal pickup design

Pilot Tone

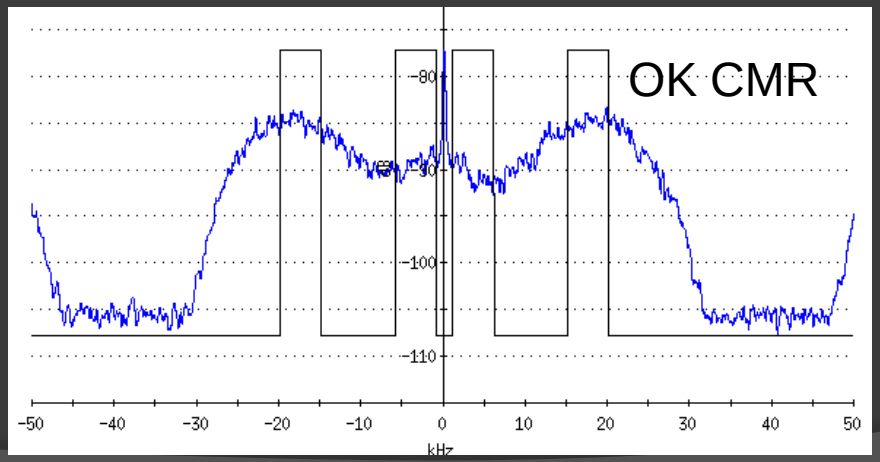
- We are progressing with the 2 frequency design
- We purchased new generators to replace the ones we had been using to generate the 5.075 GHz tone
- We are also looking at whether the 100 MHz local oscillator can be improved

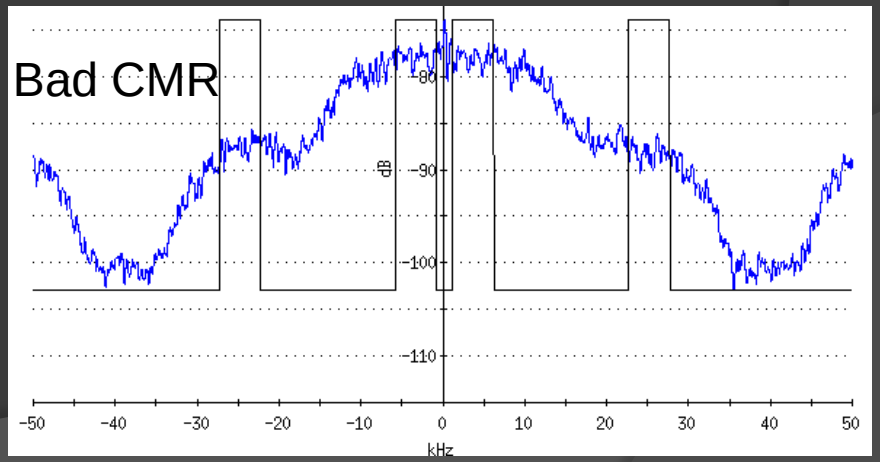




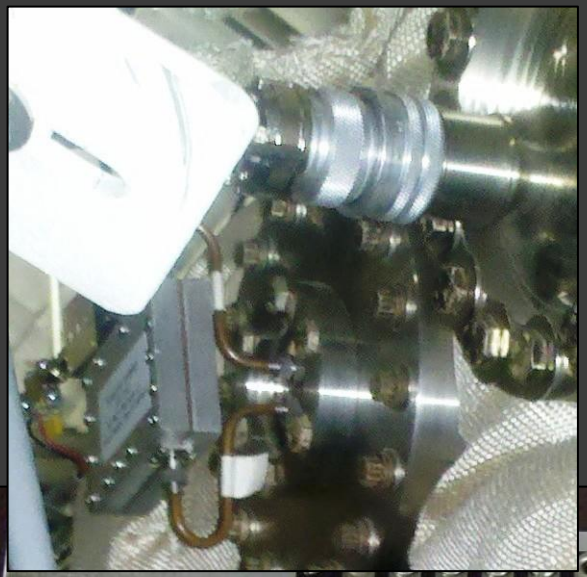
Transverse Pickup Common Mode Rejection

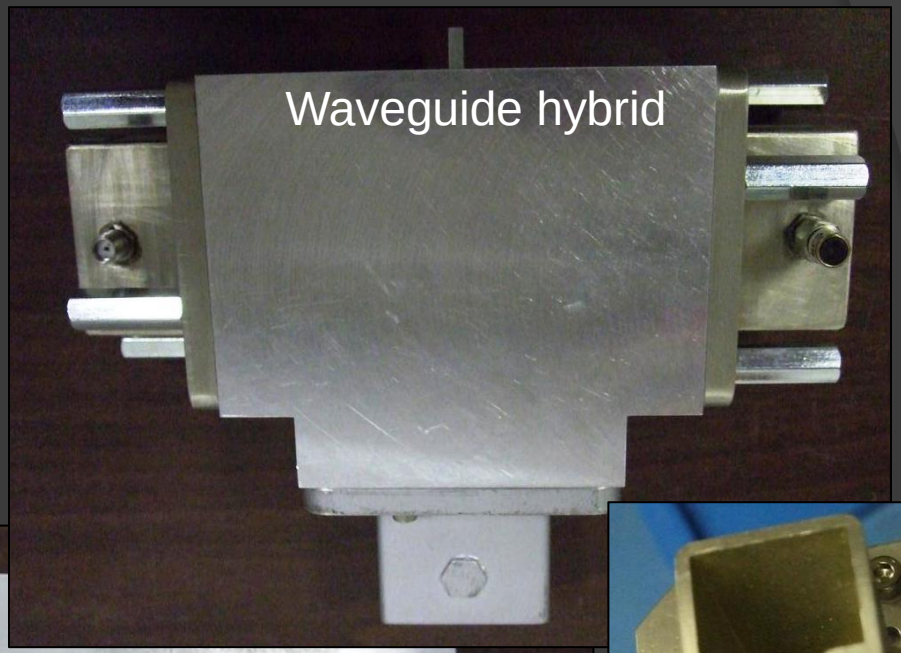
- Mike designed a new waveguide 180° hybrid for use on the transverse pickups
- We are also adding remotely controllable delay lines between the pickup and hybrid to allow us to correct for differences in cable length
- The new pickup design is also expected to improve performance

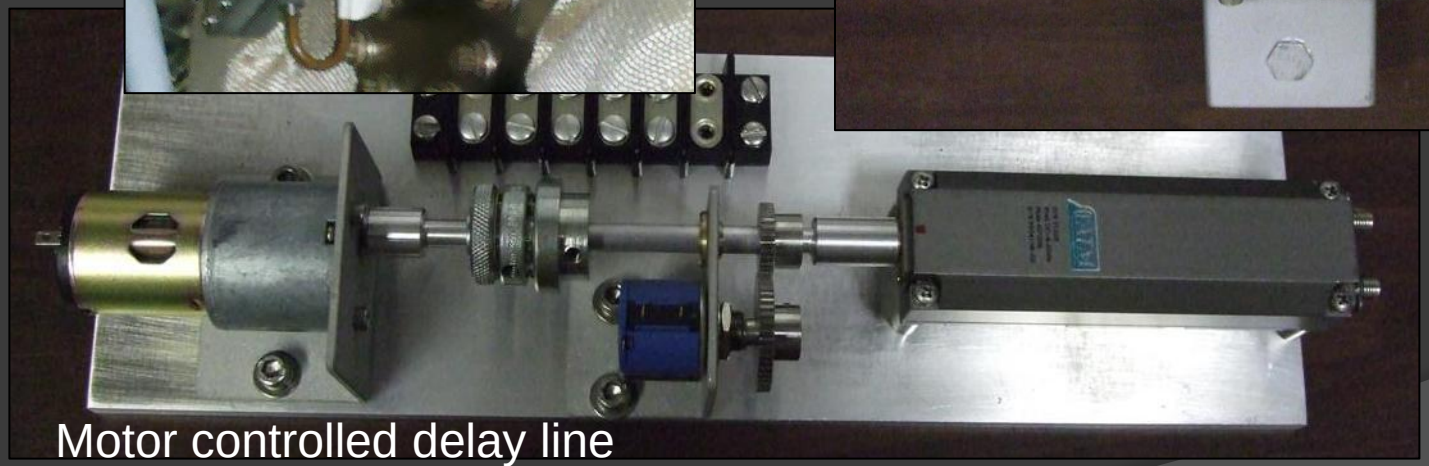


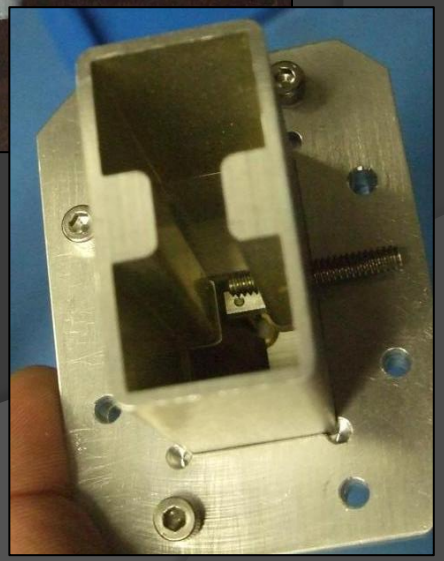


Transverse Pickup Common Mode Rejection

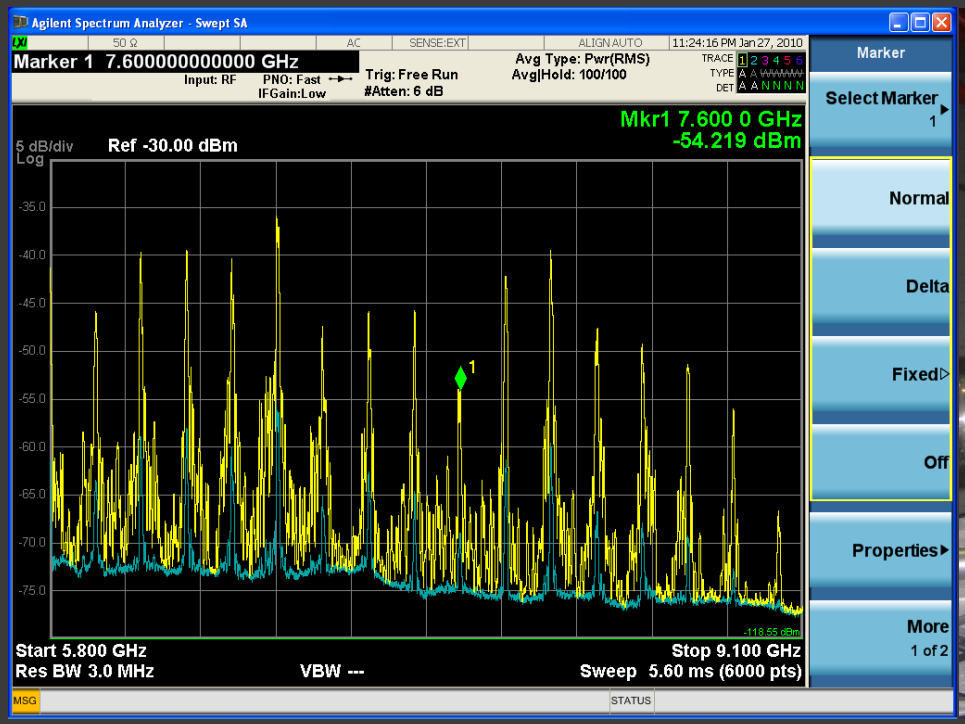


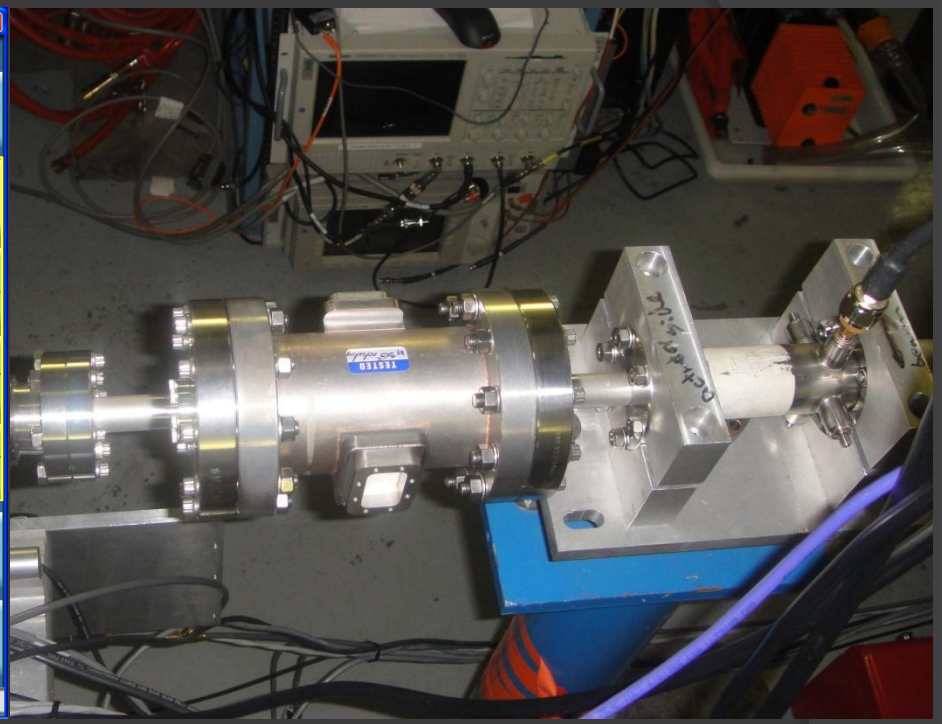






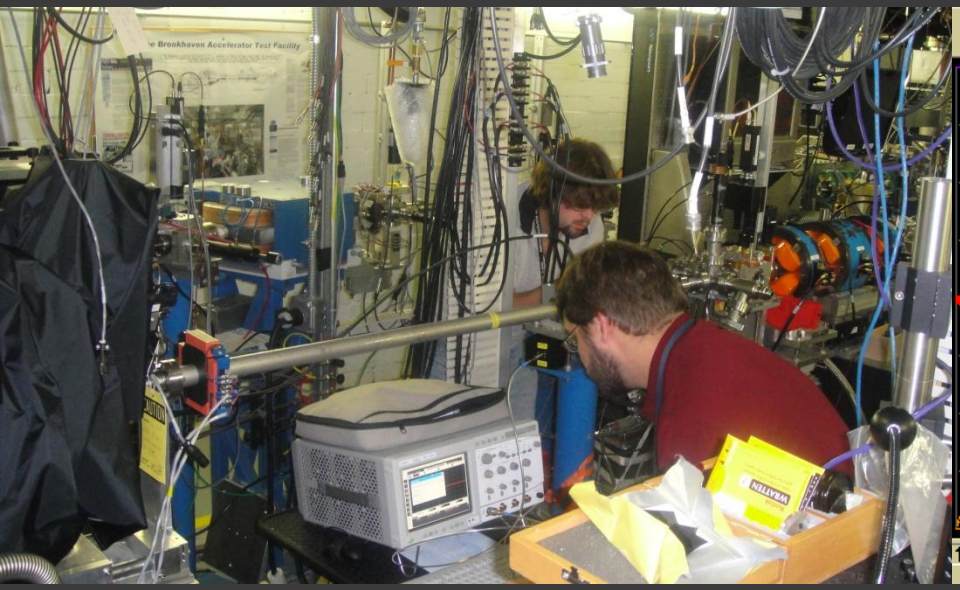
Longitudinal Pickup Performance

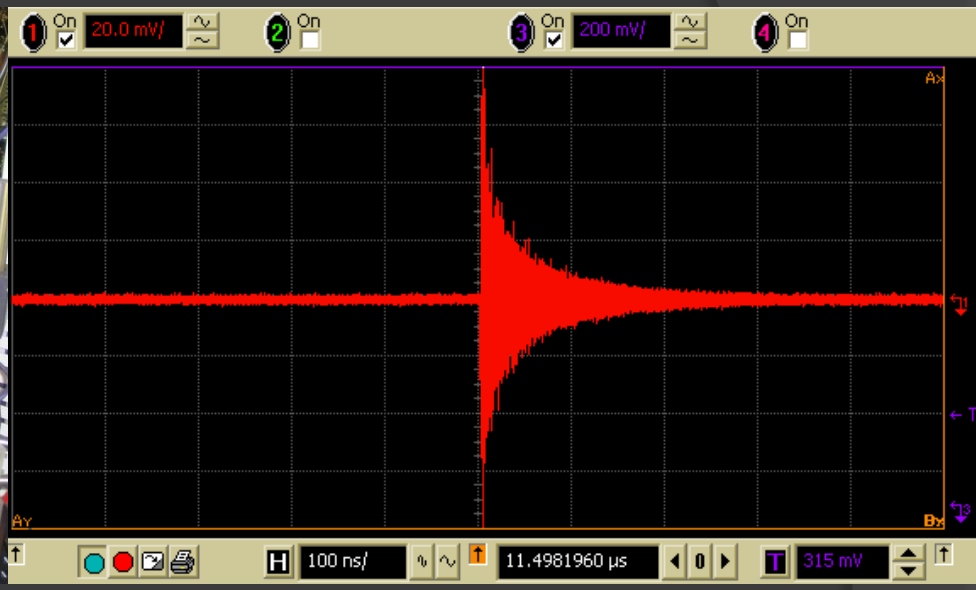




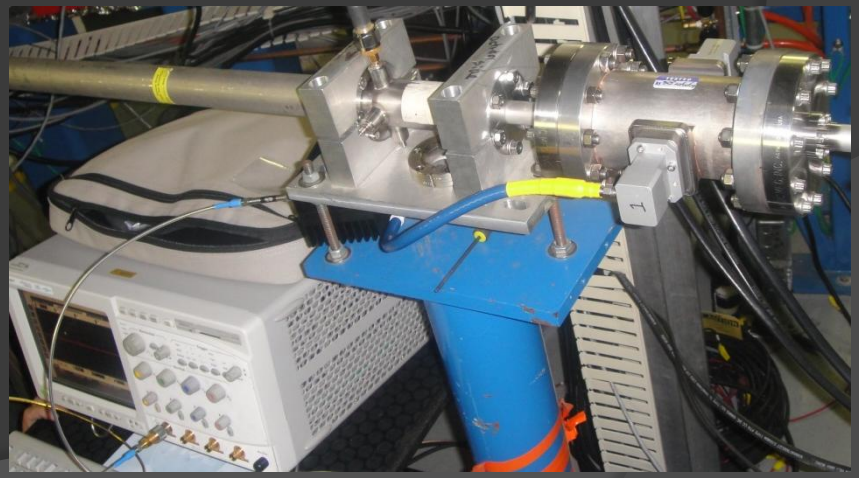
- The response of the longitudinal pickups is not flat across the 6 – 9 GHz band
- We suspect this is due to resonant modes of the pickup structure

ATF Pickup Tests



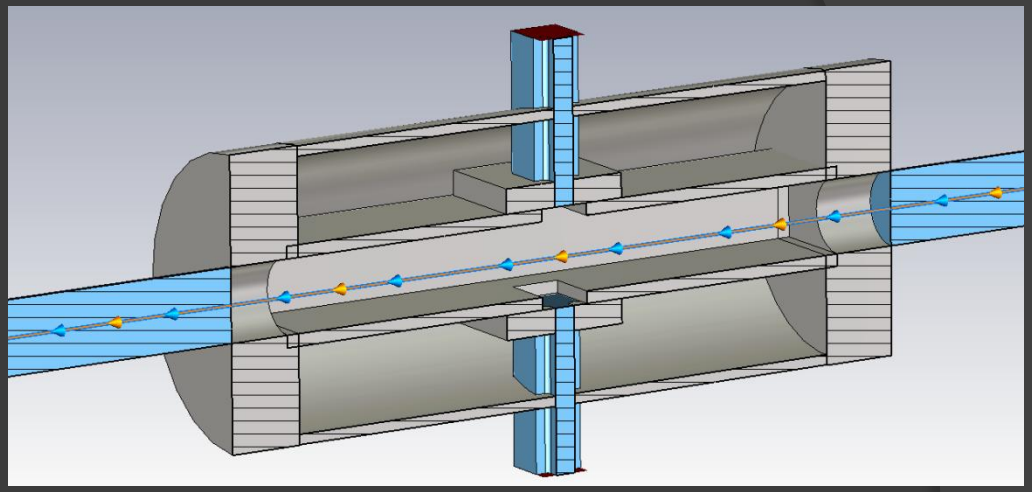


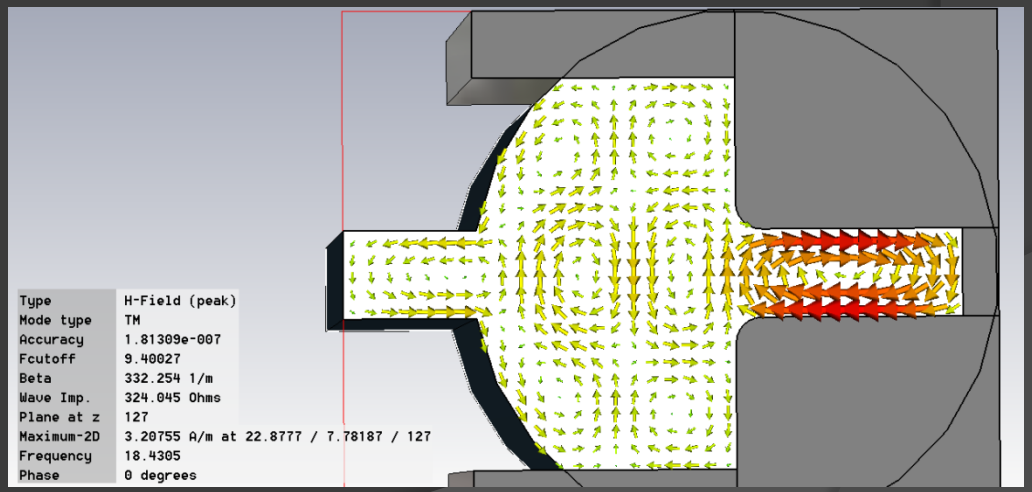
- We installed a pickup at ATF for testing
- Since the ATF beam is a delta function, it shows the pickup's resonant modes
- We can compare measured response to Microwave Studio simulations



New pickup ideas

- The goal of the new design is to cutoff all modes below 9 GHz
- We fabricated a new test pickup (top) which is being installed at ATF this week
- A possible design for RHIC (bottom) would have a large aperture for injection and ramping, and a small aperture once at store





Goals for Run11

- The major technical goal is to verify cooling works with the new cavity frequencies in blue vertical and does not suffer from interference from yellow system, allowing cooling in 4 planes at all times
- We also want to evaluate the performance of the new pickup mechanical design in blue horizontal (without cooling)
- There are numerous incremental improvements that we are working on and will implement before and during the run, such as the pilot tone and transverse pickup electronics changes